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ABSTRACT

A review of the history of libraries from the viewpoint of a speaker in the year 2080 describes the opposing trends of a shift of human values toward individuality and diversity, while technology was becoming more uniform. Man-computer relationships steadily replaced people-to-people relationships. While the cost of contact services rose, technological advances brought electronic service costs down. By 2030, most of one's time was spent putting information in or taking it out of communication devices. Information needs increased but libraries could not keep up. Huge data banks made retrieval inefficient. To combat these dehumanizing, and unfulfilling trends, people shifted back toward informal information exchange networks, browseries, and specialty information libraries. The response to this position paper argues that rather than having a dehumanizing effect, the computer is leading the consumer society away from mass-produced homogeneity. Technological intercommunication including teleconferencing is increasing leisure time. The symbiotic person/computer relationship will free the person for human interaction, development, and creativity. Rather than a schism between library science and information science people, librarians should act to utilize information science to further the needs of its own development. (Author/MBR)

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News

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INPUT, OUTPUT, THROUGHPUT AND KAPUT

Position Paper on
TECHNOLOGY

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Esther M. Swaker

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

March 1978

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IR006078

As a non-librarian, I've been invited to submit a "blue sky" paper on the library of the future, especially in light of possible technological developments. I've taken the format seriously but not literally. I know no more about the future than you, but I have worked hard to think the unthinkable in the hope that you might find it provocative. I've made my academic colleagues both amazed and uncomfortable by doggedly pursuing with them the question, "What would happen to you if the university library budget shrank to zero?" And, of course, the response is, "I could not function." "Does that mean you would have to quit teaching?" "No--but. . ." and the conversation would heat up over the course of an hour and end, -- not infrequently with, "If you are suggesting that the money saved on the library would be available to me in phone, travel, etc., then perhaps. . ."

I conclude from such experiences that it takes a minimum of 60 minutes to make the unthinkable thinkable, and that (hopefully in less than 60 minutes) is the purpose of this paper.

The best way to see the future is to stand at some point -- say 100 years from now - and look back. Fortunately I am able to do this. I projected myself to the nation's tricentennial and I have brought back a paper reviewing the history of libraries.

The paper was delivered specifically in connection with the dedication of the relocated Library of Congress which, after the take-over by the Smithsonian Institution as a museum, had been moved stone by stone to Colonial Williamsburg.

The author, Arthur Schlessinger VI, an eminent historian of that era, begins his paper with the observation that even as late as 1976 information was dispensed essentially the same as in 1776 so that for

him the interesting period for analysis comes much after 1980. He starts on page 2 and I quote:

"For those who cared to see, the precursors to change were noticeable as early as 1980, some hundred years ago. The forces had been subtle but unmistakable. Mass media -- especially cable TV with its enormous diversity of programming -- had a major impact on fragmenting family values. Supreme Court decisions affirming individual rights, the Freedom of Information Act, and a host of legislation and court actions dealing with copyrights, privacy and consumer rights drastically changed America's image of itself. The monolithic ethics of our Puritan past had given way to individuality as an inalienable right. The melting pot mythology had been superseded by ethnicity. This acknowledgment of the diversity and difference as a value was strongly fed by the press' fascination with split brain research of the mid-1970s--which also triggered the fundamental changes in our educational system.

"What is especially significant is that this shift in human values toward individuality and diversity should have developed at a time when technology generally was moving in the opposite direction--becoming more uniform in response to forces of standardization, government regulation, compatability, economy of scale, and bench mark requirements. These opposing trends have rightfully been referred to as the optimization paradox, which I believe has its roots in economics.

"The computer, in a multiple of forms, began playing an ever larger role in people's day-to-day lives. The man-computer relationships steadily replaced people-to-people relationships, significantly affecting the economics of work and leisure.

"Figure 1 shows the eyeball-to-eyeball unit cost-trend versus electron-to-eyeball unit costs, taking 1980 as the base year.

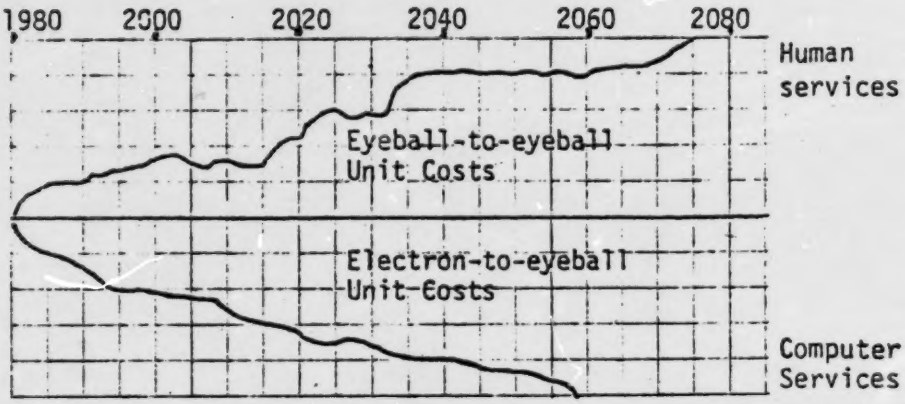

FIGURE 1

The dramatic rise in eyeball-to-eyeball, i.e., human contact services costs, reflected not only increases in salary and wages, but in energy, transportation, legal costs including liability insurance. These factors impacted electronic services to a far lesser degree--in fact, were totally outweighed by the immense efficiency improvements achieved through standardization, modularity and language optimization. But the big leap forward came when the key to safeguarding privacy of information was perfected, the 'Rivest privacy code,' making possible further diversification of the electronic industry and huge economies of scale, which, coupled with further advances in technology, brought costs down dramatically. Clearly, the economics of mass uniformity favored technological development.

"But a small cloud was appearing in the bright sky of technology--precursing a concern for individuality on the personal-humanistic level. This corollary influence, which was to grow significantly, can be seen in Figure 2.

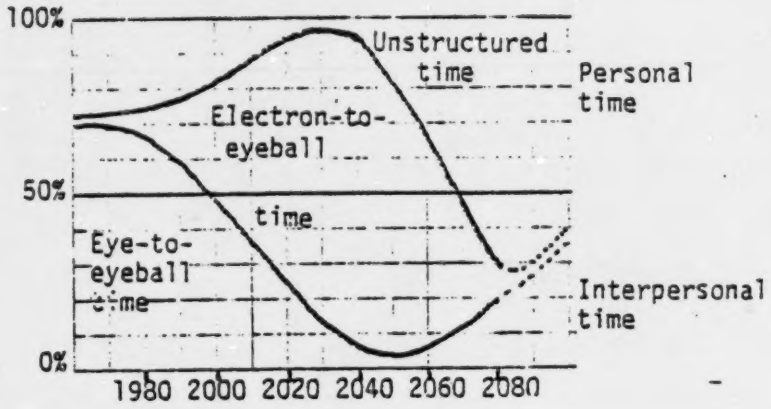

FIGURE 2

Relative distribution of time spent in human contact and in technology contact at personal discretion in percent.

"Figure 2 reflects the impact of declining electron-to-eyeball costs as early as 1980. More and more electronic processing became available so that everyone spent proportionally more time individually storing and retrieving information. In short, demands on individual time for electron-to-eyeball contact increased dramatically, cutting into time for personal and interpersonal contacts. By 2030 some 90 percent of available time was spent either putting information in or taking it out of communication devices--triggering a rebellion against such dehumanization. People were literally starved for social contact and time for themselves.

"At the beginning of the millenium, the seeds of change were taking root. It could be seen in the decline in demand for computerized information driven and organized government services, in increasingly vocal attitudes against bureaucracies and in the emergence of personalized networks.

"Nowhere was the impact of these trends more dramatic than in the development of libraries. As early as 1980 libraries really had no choice but to plan to go all out electron to eyeball. The move was partially dictated by government policies, such as the Library of Congress abandoning card indexing for its machine readable MARC tape system--but above all the reliance on electronics was triggered by rapidly rising labor costs. No library could afford resident catalogers. In fact, they could hardly afford the reference librarian who showed patrons how to use the computer terminals.

"Naturally, shelvable acquisitions had to decline, making it more and more difficult to meet mundane public needs. And the public's needs were growing--not only in information but in media terms as well. Before 1980 users expected only printed information--but now they wanted artifacts as well. They were no longer satisfied with a description or a picture--they wanted to hold historical implements--such as a fountain pen or slide rule in hand to see what it felt like--as they could in some museums. Moreover, they wanted old movies and TV reruns, and all sorts of personal electronic information to be extracted from national genealogical and health data banks. And they expected lots of special services, most mandated by legislation. The excellent service for the elderly, the blind and handicapped, started by the Library of Congress could not keep up with burgeoning demands from what came to be known as the XH's--the experimentally handicapped--those who suffered because of federally financed educational and sociological experimental projects which backfired.

"In spite of all these demands, and in the face of rising costs--the coup de grace--probably occurred when information retrieval

outdid itself. With high speed electronic searching and system integration--fostering the aggregating of even larger data bases, society's collection and storage ability overtook its ability to retrieve with the same efficiency. Thus, what was even the simplest inquiry tended to bring forth more information than any individual could digest. The fun of finding or discovering was replaced by a Roman banquet of information for which people had no appetite. Ever more ingenious efforts were made to be selective, to improve the precision of retrieval, but they failed. The sheer volume of the search domain could simply not be overcome.

"By this time publicly supported libraries, as they were known before the year 2000, were practically defunct. Budgets were severely cut as libraries failed to meet the public's diversifying needs and as people simply had less and less time to spend in libraries. The typical TV set at home now had over 100 channels--making it almost impossible not to find something that seemed important enough not to miss. But above all, the average citizen spent 1 1/2 hours per night at a home electronic console just paying bills, following the stock market, planning meals and vacations, ordering goods and services, updating his medical data bank, and responding to his electronic mail. Children were using them in an interactive mode to do their homework.

"Therefore, the occurrence of an intuitive and synchronous rebellion one-third of the way into the millenium should not have come as a surprise. Somehow the idea spread that there were simply too many systems, systems totally dependent on citizens feeding them statistics and information on every aspect of life. Even though it meant breaking the law--people began to quit. They quit by the thousands, encouraged

by slogans and bumper stickers, which started in New York City and rapidly swept the nation: 'Terminate the Terminals,' 'Exput and Input,' 'Go on the Information Diet, You Need Less Than You Think.'

"The wave spread dramatically. Bankers, health commissioners, census officials, librarians suddenly realized they had been using slave labor--millions of uncompensated hours of the citizenry to maintain the systems. The systems crashed. Everything changed, almost overnight.

"People suddenly had time again, personal eyeball-to-eyeball time, as Figure 2 clearly shows. They rediscovered the joy of chatting and debating with people, of lying under trees, of staring into the sky thinking, of finding old dusty books in attic trunks, in warehouses, and reading from the printed page. The nation had rediscovered non-systems and the sweet taste of individual freedom and personal choice, the very foundation of our democratic system.

"Those who could afford began subscribing to several of the information-service specialty houses, spawned from the few that existed a century ago, for example, in law and medicine. Not only could the specialty houses use the free information banks developed by the libraries, but they were also able to become vastly more efficient in their fields by focusing on sub-sets of information.

"That had a fascinating side effect. Libraries long ago had stopped subscribing to and thus supporting all but a few of the most important journals. Libraries simply could not afford them, so storage and retrieval of most of this information was taken over by the specialty houses, operating not only in the academic disciplines, but in the whole range of other information areas: taxation, finance, insurance, health and nutrition, handicrafts, etc. Very conscious of

costs, specialty houses were far more selective than the multiplicity of journals and libraries had been. The publishing syndrome at universities, therefore, became most unfair. Only in some very narrow specialty house fields did the average faculty member have a chance to get published. This was particularly hard on the classic academic disciplines. Thus, AAUP standards for tenure and promotion gradually dropped publication as a criterion.

"But scholarly research did not stop. Informal information exchange networks began to flourish. Advances in technology enabled monographs, reports, and books to be automatically stored, electronically, from the original typing, to be retrieved only when actually needed. These developments greatly unburdened the remaining libraries of vast amounts of little, if ever, used printed materials.

"With this material cleared out of libraries, they were able to renew their attention to broader services. But times had changed; they could not go backwards. The past could not be recaptured.

"Except for the transition to electronic network indexing, adopted by virtually all libraries, most holdings had become static. Public libraries still in existence were little more than free sources of shelter, most looking more like cobwebbed city missions than libraries of the past. University libraries, too, had their troubles. A few professors used the libraries in the older traditional sense, since they had stocked it years earlier in their areas of research interest. Students turned to libraries when they could not conveniently reach terminals elsewhere on campus, using the library's largely idle terminals and turning libraries into a form of computer center annex. But many boycotted the other library services, protesting copyright fees

and duplicating costs as forms of hidden and dishonest tuition increases. Many campus bookstores became bigger than the libraries.

"Special purpose libraries, supported primarily by government grants, were the only truly viable ones. Their main users were the specialty houses, which lobbied for these grants and felt free to use these libraries as public resources. In fact, specialty house representatives frequently sat on the boards of such libraries.

"What happened was that information had become the privilege of the rich. They could subscribe to a remarkable spectrum of services. Through terminals in their homes and offices, billed through the telephone, they could not only initiate searches or be apprised of any type of publications specified, they could even order through the terminals. They could afford to rent electronic tablets which, held in hand as a book, could be scanned or read by pressing a button to turn pages. If desired, a hard copy could be produced right at the terminal.

"These, in rough brush strokes, were the developments which have led up to our present era, which began ironically with the settlement, after many decades of litigation, of an anti-trust case against IBM. Cash reserves which IBM had accumulated as a protection against possible adverse judgments were suddenly freed. Partly philanthropically, partly as a shrewd business venture, IBM decided to enter the entertainment market in what was then the new 'browsery' field. Browseries had sprung up in shopping malls and were becoming the rage. The planners of these ventures had shrewdly recognized that people's increasing leisure time, coupled with an immense popular appetite for an escape from technology, could form the basis for a profitable service, offering eyeball-to-eyeball contact away from computers.

Thus browseries were born.

"The admission fee was equivalent to that of the antique movie theatres. People could and did easily spend hours in browseries, as we know. Almost from the beginning each had a bookstore, a softcover trading post, a kiddie corner, the closest U. S. approximation yet of the European cafe, art exhibits, music listening rooms, and above all, a battery of attendants to get computer-stored information for 'customers.'

"What people longed for was to talk to a person, not a computer. They were lonely and wanted to get out and meet with their neighbors and others in the community. Here they could do this. Let's look.

"You pay your admission and are met by a host or hostess who asks you your needs. While you have a cup of coffee, or chat with someone, your host or hostess searches out your information and brings it to you.

"Young people, especially college students, are enthusiastic users of the browseries. Serious students learn which browsery their professors frequent and often drive long distances to get there. Here they can, informally, get their professor's advice as to a term paper topic, or the best videofiche on a particular subject. Further, although students no longer study from books, it is still necessary to get out of the dorm in order to listen in peace to one's videofiche. The campus browsery is a favorite place for this activity. And it was also a good place to meet people you knew, or people you wished you knew.

"Browseries are having no trouble finding employees. Most are liberal arts graduates, who have come to the browseries from the Information Corps, which is patterned after the old Peace Corps in

spirit. In the Information Corps they are educated and get practical field training in the latest modern information management practices. A recent survey shows that most parents today want their kids to spend a year at least in the Information Corps. The government's recent decision to subsidize browseries by providing welfare recipients with browsery allowances, means that information is once again becoming universally available.

"One of the most interesting aspects of the browsery are the self-organizing stacks. These stacks consist of optically scanned spiral bookcases, designed on a self-organizing principle. The stacks are scanned by a centrally mounted optical reader to select a book. The system is a direct adaptation of the familiar supermarket technology--with books rather than grocery items selected off the shelf and funneled to a central checkout point. The difference, however, is the stacking system. Once a book is selected and taken from the shelf, the remaining books slide down the spiral shelf to close the gap. New books or returned books are entered at the top of the spiral shelf. Thus, the self-organizing arrangement has evolved--the most frequently used books--those most in demand--percolated to the top. Those of little or no interest gradually work their way down to settle at the bottom of the stack. Recently, paper shredders have been installed below the shelving enabling automatic discards from the bottom of the stack to replenish our national cellulose conservation inventory.

"This roughly brings us to the current state of our information business. We applaud those who had the vision to preserve the ancient Library of Congress as a great historical monument to the past here in Colonial Williamsburg. It is important for our youth, indeed all of us, to know and understand our civilization's past--the institutions which

have contributed to progress and those which were our follies. Without such reminders we're destined to repeat our past errors. Don't say that it could not happen again, for there remains in us a streak, especially in our institutions, which places more trust in our ingenious inventions than in fundamental human nature.

"I thank you."

And so ends the dedicatory address which I brought back from the future.

Walter Lowen holds the Doctor of Science degree from the Swiss Federal Institute of Technology. He has been Director of the School of Advanced Technology, SUNY/Binghamton, since 1967, and Dean of the school since 1968. He has been Director of Volunteers for International Technical Assistance since 1960.

RESPONSE

Professor Lowen's scenario is convincing and could happen - in fact some of his futures are with us today. I will examine his main points in some detail because it does behoove us, as he says, to "think the unthinkable." We need to devise actions which will assure the future role of libraries.

Libraries are, and have to be, competing for dollars with other groups. The problem is that some haven't yet realized it. It is equally true that if libraries do not compete successfully and leave a vacuum where a need exists, that vacuum will quickly be met by other agencies which may not necessarily be as competent and cost effective as libraries.

Yet libraries must recognize that change and volatility are essential components of biological survival.

Melvin Day, Deputy Director of National Library of Medicine, recently said that the most important thing we can do is to recognize in terms of the actions that we take and the decisions that we make - the most constant thing in this world is change. Speaking of the middle 1940's, he said "The reason that many of us are in business today is because the formal information community, which at that time was the library community, was not able to adapt to the changing requirements that were actually placed on it."

"There was a vacuum and amateurs like ourselves tried to fill that vacuum. It does seem to me that that same thing can happen to us today." Day urged that we must evaluate our investment of time and resources and apply them to new types of services, new approaches or new techniques.

I conclude with Professor Lowen that the Information or Knowledge Age and Bell's "Post Industrial Society" are highly competitive, highly political, and volatile.

In the second stage of the Lowen scenario, economics force the optimization paradox, that is, technology moving towards standardization while human values are moving towards diversity and individuality.

A component of this stage is the burgeoning of man-computer interface replacing the people to people interface.

While it is true that the economies of scale of using technology are indisputably pointing us towards widespread use of "electron to eyeball," I argue that in fact no paradox exists.

The computer might appear to be a dehumanizing factor but the opposite in reality is true. It is already leading the consumer society away from the mass produced homogeneity of the assembly line. The custom-made object now restricted to the rich will be within everyone's reach. The computer does allow for individuality and diversity as evidenced by computer assisted instruction at all levels. Further, computer technology, rapidly merging with communications technology (see attached chart) brings with it eyeball to eyeball contact allowing a variety of modes of communication, i.e., one to one, one/many, many/many, and many/one.

These already existing modes of interactive and visual communication increase and enhance people to people relationships rather than replace them. An example is seen in Columbus, Ohio's QUBE System. This is a "participating cable TV" where a QUBE subscriber, for $10.95 a month, can quiz a politician, participate in a debate, or bid in an auction. The library profession is not an idle bystander. There are

negotiations under way to link the OCLC Inc. System to the QUBE System providing the same subscriber with access to bibliographic records and their locations. Imagine the value of this service to shut-ins, remote users, or the business community.

Computer teleconferencing and other forms of electronic information exchange are being actively researched and evaluated within several disciplines to enhance people to people communication. The New Jersey Institute of Technology in Newark provides message switching, a computer managed conference, an on-line "notebook" of 100 pages and an on-line bulletin for rapid dissemination of news items comments and refereed publications.

People with similar interests geographically remotely located can talk to and see each other using these technologies.

The effects of widespread use of computer tele-communications technologies are already being felt in the availability of increased leisure time. This again argues for the fact that more not less time will be available for human relationships.

Again a hopeful response from the library/information science profession is emerging; one need only glance at the December 1977 issue of the ASIS Bulletin, a large portion of which is devoted to "Information in Play, Sport and Leisure." Such articles as "Toy Library Concept," "Toy Libraries Association," "An Information Retrieval System for the Sociology of Leisure and Sport" and "Information on the Planning Design and Construction of Recreation Facilities" point to the fact that libraries are beginning to respond to this change in society.

The argument that 90 percent of a person's time would be spent on input into a terminal strikes me as specious. After all, transacting

life's normal business, be it doing homework, taxes, shopping, travelling, paying bills, does take time. The use of technology for transacting this business will surely take less time, and provide better service especially so as artificial intelligence systems become better developed. Data once input can be reused ad infinitum, automatically reconfigured or recomputed on demand according to need. Computered produced OCLC Catalog Cards are a good example of individual service tailored to user need and in this case over 50 million per year are printed. Teleconferencing can save travel time which is often non-productive. Electronic mail can save "fetch it" time. Electronic blackboards with voice and video connections can save travel time. In short, a symbiotic person/computer relationship will free the person for human interaction, personal development and creativity.

The traditional concept of input implied by Professor Lowen conjures up a vision of a human permanently chained to a terminal keyboard. In fact a great deal of such input will be automatic via plastic cards, light pens, touch tone buttons, touch sensitive cathode ray tubes (feelies!) and perhaps even voice recognition, or done once for all in one central point by specially trained staff.

Again, the commercial sector of the information industry is marketing some of these products already. Light pens and "feelie" catalogs are already being used by libraries to better serve the user and save human time.

Standardization is of paramount importance but does not necessarily present a dichotomy with individuality and diversity. The trend today is towards a networking environment which makes heterogenous services appear as a single system to the user. Work is under way currently to develop this capability.

Looking at retrieval and the Roman banquet of information pictured by Professor Lowen - the picture is not this bleak. The miracle chip and microprocessors, video, marriage of the computer and telecommunication technologies as well as the adoption of international standards and protocols encourages distributed processing and bibliographic control.

The concept of information service specialty houses exists today. Electronic publishing and electronic mail are possibilities which will become real. On-demand publishing especially of primary sources will also occur. Alliances between vendors, A-I services, publishers and libraries are already emerging and will probably proliferate quickly in response to economical stringencies. For example, the American Institute of Physics is assessing the means of combining the searching of a remote data base (AIP's SPIN) with delivery of full text of documents via communication satellite and facsimile transmission. They may also provide approved manuscript copy for video-scanning or slow scan television transmission.

Browseries, although not in quite the fanciful form envisioned by Professor Lowen will probably become a reality very quickly based on a combination of the already existing technology and community outreach and job market programs provided by some libraries today.

The concept of the self-organizing stack is too simplistic; the Rand Retriever concept, however, is well known in inventory control and will probably continue to be used for some forms of library material. Libraries already are using central warehouses for little used material on a cooperative basis. The constraints which prevent performance of this, now, in a rational manner and on a wide scale are lack of management data which can be derived from circulation statistics, collection overlap analyses, and outmoded expectations, and

administrative demands levied on our libraries.

Regarding the need for access to information about artifacts which is described by Professor Lowen - there is a Museum Computer Network in existence and museums such as Margaret Woodbury Strong in Rochester participate both in that and in the SUNY/OCLC Shared Cataloging Network. Again, links which benefit the institution and support the individual needs of its clientele are possible.

Thus the seeds (economical and social) of the post 2000 revolution are with us today. Libraries are now examining their own on-line revolution and its impact. The potential is great if libraries can use it to satisfy user needs and control the present data rich but information poor situation.

The librarians must analyze their community and broader society, articulate the library's goal in light of such analysis, list objectives and actions to be considered for implementing achievement of the goal, weigh alternatives in terms of resources and choose the best way to deliver service. Periodic review and evaluation must then occur to monitor performance.

The implication for librarianship is two-fold as Pauline Wilson points out in Librarianship and ALA in a Post-Industrial Society. "The library must plan carefully, coordinate and become deeply involved in legislative programs and other means of assessing funding. The library educators must restructure the curriculum to broaden the knowledge base of the profession. Information science must become a core of library school programs. Theory, technology, management tools and skills now are needed to prevent a schism between the library field and the field of information science."

Biblarz says "Librarians.....should regard themselves as evolving into a management profession specializing in libraries. If we do not we may discover that when the future becomes now we will have nothing to inherit....."

In short librarians must as a profession anticipate and act rather than react. We cannot do it alone.

What of society? The Time Magazine of February 10, 1978 examines the impact of the computer on all aspects of life. Bell's definition of the Post Industrial Society consists of three major parts:

1) The social structure - made up of economy, technology and the occupational system.
2) The culture or symbolic expressions of meaning, i.e., art.
3) Polity or power and government.

Bell attributes to each of these an operating principle or "axial" principle, for social structure this is efficiency, for culture it is self-enhancement and for polity it is participation.

If libraries take the initiative and apply the above principles or axials to satisfy the needs of the post industrial society that will not be enough. Society itself - the housewife, the plumber, the nurse, any present or potential user of the library must be an active participant in the failure or success of the venture. It is only with full support of the user population through the body politic that libraries can obtain the necessary funding support. Our tomorrow will depend on just how deeply involved and well informed we <u>all</u> become today.

Teresa Strozik, Associate for Library Services, SUNY Central Administration, was educated in London and at Syracuse University. She has held various positions with Syracuse University Libraries, and is past president of the Resources and Technical Services Section of the American Library Association.